

APPENDIX H

UNCOMPAGHRE PLATEAU VEGETATION RESTORATION FIELD TRIP

Uncompaghre Plateau Vegetation Restoration and Fuels Reduction Projects GSENM Field Trip

BLM Montrose Field Office, Norwood, Colorado

7/28/04 – 7/29/04

Many BLM field offices are concerned with the vegetation changes that have occurred over the last several decades in the West. Sagebrush grasslands have lost the grass and forb components of their understories, leading to increases in shrub density. Fire and exotic invasions threaten areas where the sagebrush is dead or decadent. Pinyon and juniper trees are expanding into sagebrush grasslands, which often leads to depauperate understories devoid of shrubs, grasses, and forbs. These changes have negative implications for wildlife, livestock, and healthy ecosystem function. The Montrose Field Office (MOFO) has undertaken several vegetation treatments to restore sagebrush grasslands and reduce fuels. Grand Staircase-Escalante National Monument (GSENM) staff visited these sites with the MOFO staff to see the various treatment types in preparation for doing their own treatments on the Monument.

Participants:

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Background:

The treatments described below were established in the Dry Park allotment, which has two pastures on a deferred rotation system (MOFO only uses deferred rotations). Each pasture is used for 10 days once per year, either in the spring or in the fall. There are 750 AUMS active preference. The permittees used to use that many, but now use less (around 1/6-1/8 of the active preference). This area is also used extensively by wildlife.

Dry Park was chained in the 1960s and 1970s as part of an aggressive Bureau-wide chaining program. These efforts were concentrated in the Montrose and Kanab Field Offices. Dry Park was seeded to crested wheatgrass and alfalfa and, according to MOFO staff, “used hard” (one month in the spring and one in the fall). In the staff’s opinion, the seedings were lost due to this heavy use by livestock and elk. Pinyon and juniper increased, and MOFO embarked on a program to restore native vegetation and reduce fuels. Recent treatments include prescribed fire, rollerchopping, Dixie Harrow, Tebuthiuron (Spike), or some combination of these.

Field Trip Activities:

The group first went to the wareyard to see the Dixie Harrow. (Note: All photos in this report, along with many others, are under Z:\Veg\Photos\Norwood Field Trip.) This machine has several large, heavy metal bars with 10" flanges on them. You can adjust the degree of disturbance by adding or removing bars. This method is good for preparing a seed bed because it disturbs more soil than other methods. But the increased disturbance can also lead to increased exotics and erosion. [This appears to be the trade-off: seeding success vs. soil disturbance.] MOFO is looking at mitigating this problem with Plateau, if it's approved by the BLM as an herbicide.



Stop 1 – Rollerchop followed by burn (Location: 12S 0735304E 4233649N NAD27CONUS).

This stand was chained in the 1960s, then rollerchopped and burned in the late 1990s to reduce the pinyon and juniper and release sagebrush and other shrubs. 1960s improvements were lost due to conflicts with winter elk use and heavy grazing. Cattle grazing was kept off for two growing seasons, however cattle were allowed in for a short time right after seeding because there was no germination (about 500 head). (The burn was intended to reduce slash. Note that the rollerchopped area that didn't burn has lots more sagebrush.)

We couldn't see evidence of machine tracks over most of the site, although there was no cryptobiotic crust at all. The last photo shows the divots that the rollerchopper leaves. The hydrologist said that furrows this deep are necessary for water retention and often have better seeding success than surrounding areas.

The vegetation ecologist said that their goal for grasses in this vegetation type is 20-30% warm season grasses and 70 – 80% cool season grasses.



Stop 1 Untreated



Stop 1 Rollerchopped and burned



Stop 1 Rollerchopped only



Stop 1 Treatment interspace



Stop 1 Rollerchopping furrows

Stop 2 – Prescribed burn followed by aerial seeding (Location: 12S 0733504E 4234071N NAD27CONUS)

The area was chained and seeded in the 1960s. The prescribed burn in 1999 reduced trees and increased understory vegetative cover, especially grasses. (Note, however, that there is very little

crust.) The area across the road was also chained and seeded in 1960s but was not part of this prescribed burn. It has much less understory cover, fewer shrubs, and more trees.



Stop 2 Treatment



Stop 2 Untreated



Stop 2 Untreated closeup



Stop 2 Treatment closeup

Stop 3 – Recent rollerchopping (Location: 12S 0730622E 4238127N NAD27CONUS)
Recent rollerchopper treatment completed in June 2004.



Stop 3 Treatment harrow marks



Stop 3 Treatment

Stop 4 – Rotary beater and seeding. (Location: 12S 0712023E 4229180N NAD27CONUS)

This dense sagebrush stand was mowed and seeded with a rotary beater (brush hog) with a blade set at about 10" ht. [This sagebrush site looks similar to GSENM.] The main species that came up were SIHY, STCO, BOGR2, but they were not in the seed mix. They came in from adjacent areas. Nothing came up from the seeding itself, probably because the seed bed was not well prepared. Fortunately, the residual seed bank was adequate, so they didn't need to seed anyway. [Before we order seed, we need to evaluate whether the seed bank in the project area is depleted.]



Stop 4 Treatment



Stop 4 Untreated



Stop 4 Treatment closeup

Stop 5 – Wildfire (June or July 1999) followed by aerial seed (1999-2000) (Location: 12S 0714302E 4227377N NAD27CONUS)

This treatment didn't respond for a few years. The seed mix had 12-15 species, including 15% Siberian crested wheatgrass and Piute orchard grass. (MOFO recommends not using rye or an annual cereal grain for quick erosion control after fires, because it just doesn't work.) Pinyon and juniper burn hot, so a seeding is effective because you're killing everything and starting from scratch.

Seedlings aren't as successful in cooler sagebrush fires, because there's more competition from surviving plants.



Stop 5 Treatment



Stop 5 Treatment closeup

Stop 6 – 1996 Tebuthiuron treatment (Location: 12S 0716001E 4228305N NAD27CONUS)

The permittee treated this sagebrush stand and wanted to remove shrubs completely, so he used a very high concentration of tebuthiuron (7/10 lb/acre). In this area, fourwing saltbush is coming back, but no sagebrush is left. Also no crust.



Stop 6 Treatment



Stop 6 Untreated



Stop 6 Treatment closeup



Stop 6 Untreated closeup

Stop 7 – 2000 P-J rollerchop treatment. (Location: 12S 0729081E 4234499N NAD27CONUS)

This was a “virgin” PJ area. Treatment was done to encourage elk to stop here instead of going to nearby private hay fields. Partnership with Colorado Division of Wildlife. The trees were first pushed over with a cat, and then the area was rollerchopped and seeded. They plan to burn in 5-8 years to reduce fuels and kill new P-J seedlings. This area has islands of wildlife cover left, which is important when you’re treating large areas. The soil is very rocky. Note that cattle were allowed to graze this area this Spring. Left in late May. Won’t be back in for 1 ½ years.



Stop 7 Treatment



Stop 7 Untreated



Stop 7 Treatment closeup



Stop 7 Untreated closeup

Stop 8 – Atkinson Mountain – Rotary (brush) beater. (Location: 12S 0694429E 4252646N NAD27CONUS)

This sagebrush grassland area was plowed and seeded with crested wheatgrass in the 1970s. Sagebrush became thick and decadent. In 1997, it was treated again with a rotary (brush) beater, with the blade set very close to the ground to remove most plants. The unit was pulled behind a tractor. Sagebrush did not recover for a while, but are now 8-10” tall. The treatment was not seeded, because the seed bank was adequate. (However, there is no crust.)

This site will be rested for at least a year and a half before being grazed. MOFO staff said that perennial grasses, when grazed too hard, will be lost in a drought and will come back in cheatgrass. Here, the native grass to cheatgrass ratio is about 50:50. The returning sagebrush may help the perennials outcompete the cheatgrass over time. But climate is the main parameter determining degree of cheatgrass dominance. They said managers can only affect what they can control, which is grazing management. Deferred grazing system; 1400 head permit, but running approx. 1000 head;

grazed last year, but won't be back until Spring 2005; approx. 18 months of rest. The area is a large pasture (Mesa). Cattle tended to go to the treatment to graze. Utilization was up to 65% on the treatment, not much outside treatment area. Permitted had the choice of working the cattle to keep them out of high use areas (lots of baby-sitting) or to go off. They chose to go off.



Stop 8 Treatment



Stop 8 Treatment closeup

Stop 9 – 2000 prescribed burn (Location: 12S 0694978E 4254086N NAD27CONUS)

This area was burned during undesirable climatic conditions, resulting in weedy forbs and cheatgrass. Burn did not meet prescription. Had to put a lot of fuel on the ground, almost lighting each individual sagebrush.

MOFO felt that historically, this area probably had long fire return intervals (150-200 years) and most fires were small, unlike the large catastrophic fires we see today. To understand the role of fire in maintaining native systems, MOFO has two graduate students studying fire regimes and recruitment in pinyon-juniper woodlands.



Stop 9 Treatment



Stop 9 Treatment closeup

Stop 10 – April 2001 Dixie harrow treatment (Location: 12S 0694556E 4254632N NAD27CONUS)

The Dixie harrow was used to thin shrubs and then plant seeds at the same time. This treatment has the maximum impact on the soil. The last photo shows the tracks of the harrow. The seeding was successful because the seeds were planted so deep. However, the best response was from *Stipa comata* (Needle-and-thread grass), which wasn't in the seed mix but came in from outside. *Elymus*

trachycaulus (Slender wheatgrass) made up 15% of the mix. It is cheap and establishes quickly but will be outcompeted by residual natives in this area because precipitation is too low. Might work on higher elevations in the Monument, but probably not in lower areas. But *Elymus elymoides* (Squirreltail) will do the same thing.

You don't have to drill if you prepare the seed bed properly when you remove the trees and shrubs. MOFO only drills if there's no shrub treatment. Drilling has a higher level of success, so you can use less seed. But it has more surface disturbance.

MOFO never goes below 8-10 lbs of seed/acre, or 14 lbs/ac. of bulk seed on really damaged areas.



Stop 10 Treatment



Stop 10 Treatment closeup



Stop 10 Unidirectional effect of harrow



Stop 10 Surface disturbance from harrow

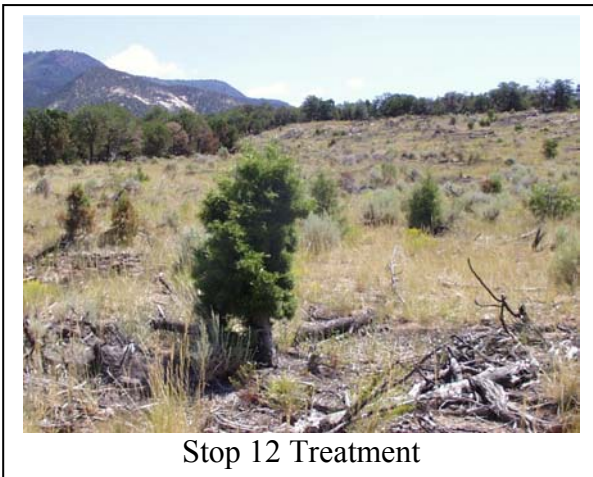
Stop 11 – 2001 Spike treatment, aerial application. (Location: 12S 0692737E 4253965N NAD27CONUS)

MOFO used 1/5 or 1/6 of the application rate of Stop 6 because they wanted to keep more sagebrush. There is no crust in interspaces, but lots of crust under shrubs. There is also very little litter, because it was grazed hard last winter. Spike does not prepare the seed bed for seeding, so you must either disturb the seed bed another way or only use this method where you have a seed bank and don't have to seed. Aerial application means the Spike is unevenly applied and sagebrush die-off will not be uniform [this may be good for a mosaic effect].



Stop 12 – Moon Basin 1997 rollerchop treatment, followed by a burn five years later. (Location: 12S 0697598E 4264721N NAD27CONUS)

The burn was intended to reduce pinyon and juniper seedlings and to burn slash left from the original treatment. But the seedlings survived, so Dean doesn't think it's worth it to burn. Sagebrush is doing well. Litter appears to be good. No crust.





Stop 13 – 2001 Rollerchop treatment. (Location: 12S 0695565E 4267203N NAD27CONUS)
 Area was burned after rollerchop. They are not happy with the effects. Going to re-evaluate burning after treatment. May not be gaining much from the prescribed burn.



Discussion, including how MOFO operates, answers to questions, musings, and other miscellany:

Treatments:

- Pretreatment: Clean machines of weed seeds before treatment. Survey areas adjacent to treatment and remove weed sources before treating. Write post-treatment and post-monitoring money into the EA so you'll have funds to monitor and manage treatment.
- Their permittees stay off the treatments for at least two growing seasons (i.e. two seasons when rains came and plants have a chance to grow). You can't put cows back on until grasses have headed out and you can see that the treatment succeeded, which may require three to four growing seasons. Native seedlings may take several years to come up (1-4), and everyone needs to understand that it may take a while to see results. It took a lot of years to degrade the range, and it will take a lot to restore. MOFO conducts monitoring on the treatments at two- and five-year intervals. They don't have a hard and fast protocol for deciding when cows should be allowed back on the seeding. Range specialists consider the amount of production and level of weeds, but otherwise it seems like it's a professional judgment. Need to maintain treatments and not graze them too hard. Entities that are contributing financially to your

project, such as DWR or the Mule Deer foundation, need to see success. They won't continue to fund your projects if you don't take good care of them and let the permittees back on too early.

- Do test plots before you treat a lot of acres.
- In formulating seed mixes, take into account cost, availability of seed, and seeding success. MOFO uses all native seed except for some forbs that don't persist (i.e., red burnet). MOFO uses 12-15 species on their seed list to increase their chances that at least some species will grow in the climatic conditions that occur right after the seeding. Non-natives are only used as a stop-gap measure. They almost always broadcast or aerial seed prior to treatment, and they make sure to prepare the seed bed well. The success of drilling isn't all that much better than the broadcast method and it's more expensive.
- One thing to consider is mycorrhizae, which are necessary for many native plant species and which may not be present in adequate amounts in altered systems, especially those converted to weeds. This could have an effect on the success of your project. Unfortunately, no one knows much about this [although GSENM has a graduate student working on mycorrhizae/soil stability relationships in the Circle Cliff seedings].
- Crested wheatgrass actually isn't that good for erosion control because it's a bunch grass rather than a sod-former. (However, it usually doesn't invade areas where it's not planted.) Consider going to blue grama from local sources. In the past, crested wheatgrass monocultures were considered sacrifice areas that reduced use on other upland areas, but they don't really act that way. Upland areas continue to be impacted anyway. (Jim and Dean don't agree on this point.) When putting in a treatment, GO BIG so cattle and wildlife don't concentrate in the new seeding and wreck it. Do a lot of acres at once if you can. It'll be hard to control their distribution at first, but you just need to keep putting in treatments and eventually grazers will disperse better.
- Cows don't work that well as an agent to trample seeds into soil because they have to be really concentrated to be successful.
- Comparison of treatments: Hydroaxe (bullhog) – potentially has less surface disturbance, unless your treatment units are small and the machine has to make a lot of sharp turns. This produces deep grooves in soil. Hydroaxe is very accurate, you can only take what you want and leave shrubs. Litter left from tree will smother crust. Spread out mulch. Tebuthiuron – Sagebrush doesn't come back from this treatment for 10-12 years. But cheap, and soil disturbance is minimized. Lawson aerator - a good method, similar to rollerchopping. The Lawson aerator costs \$50.00/acre.
- \$50,000 will treat 600-700 acres.
- Regarding the NRCS determination of GSENM soils that are not suited for seedings: Dean, who used to work for the NRCS, says there's very little you can do. Only use species that will succeed in these dry areas. Try to increase the health of the soil so more water is retained onsite, including managing vegetation so an adequate amount of litter is left on the ground. Imprinting and roller chopping will lay down vegetation and provide litter. Disking, however, disrupts soil aggregates and decreases water infiltration.
- Fire should not be the first tool of choice because it is too hard to control timing, duration, intensity, acreage, etc. so you don't know what you'll get. It may be worse than what you started with. P-J vegetation is hard to burn, you need lots of wind and crown fire. So don't try to control natural fires, they probably won't get that far in these vegetation types anyway

- Questions we should have asked: What was the potential for these sites? How do you know if the pinyon-juniper site you're treating is naturally a pinyon-juniper site, and forcing a shrub treatment will eventually fail? I strongly feel we should only attempt treatments that will restore the vegetation that "should" be on the site as determined (as far as we can tell) by soils, range site description, etc. This will reduce the chances that the treatment will need to be constantly maintained (for example, removing trees where the trees should be and will constantly return seems like a doomed effort that is likely to fail, but not before it sucks up huge amounts of money and energy). I am in favor of reducing trees in sagebrush grasslands and then seeing what happens. If trees return, and the grazing has been managed properly, then it's probably a climate-driven threshold change and we can't fight it. We may have to accept the fact that climate change is turning a lot of our sagebrush grasslands to savannahs.

Revegetation Planning:

- You need a plan to define when you've achieved your goal. MOFO wove their revegetation goals into their fire plan and detailed by percentage how much of which age class they wanted to see for forbs, grasses, shrubs, and trees in different areas. They used research on the local native fire regime to determine these percentages. Incorporate the concept of Adaptive Management into your plan so that you can adjust percentages as needed. Don't lock yourself in, especially because we don't really know what percentages should be and may need to change plan as new information rolls in.

Grazing management

- Going to winter grazing is very beneficial to grasses, but don't think that the grasses are dormant and can't be hurt in the winter. You still have to be careful. One of MOFO's winter-only pastures developed a weed problem, which may or may not be related to season of use. MOFO has very few summer permits. Cattle need to be moved around so that they're only in one spot long enough for "one bite". To keep an eye on this, you need to have a handle on how much an area is being used, so cows can't be scattered. If you're on top of the cow distribution, you might not have to take the time to do utilization.
- Combining allotments and reducing herds is a great idea in theory but not very practical for a variety of reasons. Logistics, personal differences make it hard.
- Colorado DWR has bought an allotment and converted the AUMs to wildlife. [Maybe Utah DWR could buy Calvin's allotment.]

Biological Soil Crust

- These guys don't include cryptobiotic crust at all in their monitoring because they just don't know what should be here.

Exotics

- Cheatgrass: control by not grazing in spring. There is no evidence that grazing cheatgrass in spring will really reduce populations.
- Water developments: MOFO has found a 1:1 correspondence between their water developments and weed infestation, especially Russian knapweed [many GSENM Russian knapweed populations are also around developments].